

**Listing of the Claims:**

1. (Currently Amended) A rotary die apparatus for use with a first rotary die having a first axis of rotation and a second rotary die having a second axis of rotation parallel to the first axis of rotation comprising:
  - a base;
  - a plurality of elongate columns, each column having a first end and a second end defining a path of travel along a length thereof, the first end of each column mounted to the base in spaced relationship to one another;
  - at least one cross member positioned transverse to the first and second axis of rotation, each cross member movably engaged with respect to at least two of the plurality of columns for movement along the path of travel;
  - a at least one first modular die support mounted directly to the base separate and independent of the plurality of columns, the at least one first modular die support in a location spaced from the columns, the first modular die support providing exclusive support vertically, horizontally transverse to the first axis of rotation and longitudinally along the first axis of rotation through rolling engagement with the first rotary die independent of the columns and in exclusive rolling, vertically upwardly supporting engagement with the first rotary die; and
  - a at least one second modular die support mounted to the cross member in a location spaced from the columns, the at least one second modular die support adjustably loading force between the first and second rotary dies while in exclusive rolling, vertically downwardly pressing engagement with the second rotary die.

2. (Cancelled)

3. (Previously Presented) The apparatus of claim 1 wherein the first die is in rolling engagement with the second die.

4. (Currently Amended) The apparatus of claim 3 9 wherein the first rotary die further comprises a first end surface and an opposite second end surface, the first die having a radially raised flange adjacent to ~~at least one of~~ the first and the second end surfaces.

5. (Currently Amended) The apparatus of claim 4 wherein each of the raised flanges defines a shoulder operably engageable with operably engages the corresponding rollers of the first bearing and the second bearing of an alignment surface associated with the first modular die support to limit linear longitudinal translation of the first die along the first axis of rotation.

6. (Currently Amended) The apparatus of claim 4 5 wherein each of the raised flange flanges defines a shoulder operably engageable with a corresponding end of the second die to limit linear longitudinal translation of the second die along the second axis of rotation.

7. (Previously Presented) The apparatus of claim 1 wherein the cross member further comprises a first cross member and a second cross member, the first

Date April 1, 2004

Reply to Office Action dated December 17, 2003

and second cross members positioned on mutually exclusive, opposing sets of columns located in spaced relationship with respect to one another.

8. (Previously Presented) The apparatus of claim 1 further comprising a pressure member operably engaged with the cross member for selectively adjusting the position of the cross member along the path of travel.

9. (Currently Amended) The apparatus of claim 1 wherein the first and the second modular die supports each ~~further exclusively~~ comprise a first bearing assembly and a second bearing assembly positioned in longitudinally spaced locations adjacent each end of the corresponding first and second rotary dies, each bearing having at least two rollers with axes of rotation extending substantially parallel to one another and each roller angularly spaced from one another with respect to the axis of rotation of the corresponding first and second rotary dies.

10. (Currently Amended) The apparatus of claim 1 wherein the first rotary die and the second rotary die each further comprise a first end surface and an opposite second end surface, each die having an elongate journal extending from the first and second end surfaces along the axis of rotation; and

the first and second modular die supports each further comprising a pair of cylindrical roller bearings independent of and spaced from the columns positioned along the axis of rotation, each cylindrical roller bearing operably engaged with one of the journals for permitting free rotation of the die about the axis of rotation.

Date April 1, 2004

Reply to Office Action dated December 17, 2003

11. (Original) The apparatus of claim 10 further comprising at least one spacer positioned between the first and the second modular die supports.

12. (Currently Amended) A rotary die apparatus comprising:  
a frame having a base, a plurality of elongate circular columns having a first end and a second end defining a first axis of movement along a length thereof, the first ends of the columns removably mounted with respect to the base and the second ends of the columns removably mounted with respect to a cover, at least one cross member, the cross member movably engagable with respect to at least two of the plurality of circular columns for movement along the first axis;

a first rotary die having a first axis of rotation, the first die having a first end surface and an opposite second end surface, ~~at least one and a raised radial flange adjacent at least one of the first and second end surfaces;~~

a second rotary die having a second axis of rotation positioned in substantially parallel alignment with the first axis of rotation and rollingly engaged with the first die, the second die having a first end surface and an opposite second end surface positioned axially inward of the radial flanges and operably engaged with the radial flange of the first die to limit linear translation of the second die along the second axis of rotation, the cross member positioned transverse to the second rotary die having the second axis of rotation;

a first modular die support removably mounted directly to the base in a location spaced from the columns, the first die support having a first bearing member and a second bearing member, the second bearing member separated from the first

Date April 1, 2004

Reply to Office Action dated December 17, 2003

bearing member along the first axis of rotation, the first and second bearing members each having at least two rollers, ~~in exclusive rolling vertically upwardly supporting engagement with the first rotary die~~, each roller having an axis of rotation substantially parallel to one another and angularly spaced from one another with respect to the first axis of rotation; providing exclusive support vertically and horizontally transverse to the first axis of rotation through rolling engagement with the first rotary die, at least one of the first and second bearing members operably engaged with the raised radial flange to limit movement of the first rotary die longitudinally along the first axis of rotation; and

a second modular die support removably mounted directly to the cross member in a location spaced from the columns, the second die support having a first bearing and a second bearing member, the second bearing member separated from the first bearing member along the second axis of rotation, the first and second bearing members each having at least two rollers in exclusive rolling vertical downwardly pressing engagement with the second rotary die, each roller having an axis of rotation substantially parallel to one another and angularly spaced from one another with respect to the second axis of rotation.

13. (Currently Amended) An improved rotary die apparatus for use with a first rotary die having a first axis of rotation and a second rotary die having a second axis of rotation, the second axis of rotation parallel to the first axis of rotation, the apparatus having a base, a cover opposite the base, a pair of opposing cross members positioned transverse to the first and second axis of rotation, the cross

Date April 1, 2004

Reply to Office Action dated December 17, 2003

members moveable between the base and the cover, and a pressure member operably engaged with the cover and the cross members, the improvement comprising:

four elongate rods having a first end and a second end, the first end mounted to the base parallel and spaced from one another, and the second end mounted to the cover defining a length, the rods having a uniform cross section along the length between the base and the cover;

a first modular die support having a first bearing and a second bearing positioned spaced from one another with respect to the first axis of rotation, each bearing mounted directly on the base in a location spaced from the rods, each bearing having at least two rollers, each roller having an axis of rotation substantially parallel to one another and angularly spaced from one another with respect to the first axis of rotation, the rollers providing exclusive support vertically, horizontally transverse to the first axis of rotation and longitudinally along the first axis of rotation through rolling engagement with the first rotary die independent of the columns positioned to be rollingly engaged with the first rotary die for permitting free rotation of the first rotary die about the first axis of rotation; and

a second modular die support having a first bearing and a second bearing positioned spaced from one another with respect to the second axis of rotation, each bearing mounted to one of the cross members spaced from the columns to be rollingly engaged with the second rotary die, for permitting free rotation of the second rotary die about the second axis of rotation.

14. (Currently Amended) The apparatus of claim 13 wherein the first die further comprises:

a raised radial flange adjacent at least one of each of a first and a second end of the first die; positioned longitudinally outward along the first axis of rotation from the bearing rollers, each the radial flange operably engaged engagable with the first modular die support bearing rollers located longitudinally inward along the first axis of rotation to limit linear translation of the first die along the first axis of rotation.

15. (Currently Amended) The apparatus of claim 14 wherein the second die further comprises a first end and an opposite second end positioned axially inward of the raised radial flanges, each of the first and second ends operably engages engagable with the adjacent radial flange of the first die along the first axis of rotation to limit linear translation of the second die along the second axis of rotation.

16. (Previously Presented) The apparatus of claim 13 wherein the first and second bearing of the second modular die support comprise at least two rollers, each roller having an axis of rotation substantially parallel to one another and angularly spaced from one another with respect to the second axis of rotation.

17. (Previously Presented) The apparatus of claim 13 wherein each of the first and the second bearings of the second modular die support further comprise a cylindrical roller bearing for rolling engagement with a journal on the second die.

Claims 18-35 (Cancelled)

36. (Cancelled)

37. (Previously Presented) The rotary die apparatus of claim 1 wherein the elongate columns are uniform and circular in cross section along the length.

38. (Cancelled)

39. (Previously Presented) The rotary die apparatus of claim 12 wherein the elongate columns are uniform in cross section along the length.

40. (Currently Amended) A rotary die module for use with a first rotary die having a first axis of rotation and a second opposing rotary die having a second axis of rotation, the rotary die module comprising:

a base;  
four parallel elongate rods having a first end and a second end defining a first axis of movement along a length thereof, the first ends of the rods mounted to the base, the rods spaced with respect to one another defining two pair of opposing rods with one pair of rods adjacent each end of the base, the second ends of the rods mounted to a cover, the rods having a uniform cross section along the length between the cover and the base;

Date April 1, 2004

Reply to Office Action dated December 17, 2003

a pair of opposing cross members, each cross member positioned on one pair of rods and extending transverse to the first and second axis of rotation, each cross member movably engaged on the rods for movement along the first axis of movement;

a first modular die support having a first bearing and a second bearing, the second bearing positioned spaced from the first bearing with respect to the first axis of rotation, each bearing having at least two rollers, each roller having an axis of rotation substantially parallel to one another and angularly spaced from one another with respect to the first axis of rotation, each bearing attached directly to the base spaced from the columns, the first die support providing exclusive support vertically, horizontally transverse to the first axis of rotation and longitudinally along the first axis of rotation through engagement with the first rotary die, the rollers of at least one of the first and second bearings operably engaging a shoulder defined by a raised radial flange on the first rotary die to limit linear longitudinal translation of the first rotary die along the first axis of rotation; to receive and rotatably engage the first rotary die;

a second modular die support having a first bearing and a second bearing, the second bearing positioned spaced from the first bearing with respect to the second axis of rotation, each bearing having at least two rollers, each roller having an axis of rotation substantially parallel to one another and angularly spaced from one another with respect to the second axis of rotation, each bearing directly attached to one of the cross members spaced from the rods to receive and rotatably engage the second rotary die; and

a pressure member engaged with the cover and the cross members for controlling movement of the second modular die support along the first axis of movement.

Claims 41-45 (Cancelled).

46. (Currently Amended) A rotary die apparatus comprising:

a base;

a lower die support bearing mounted directly to the base;

a first elongate rotary die rollingly supported on the die support bearing;

a second elongate rotary die rollingly supported with respect to the first rotary die, the first and second rotary dies having a maximum outer diameter;

a plurality of elongate columns mounted directly to the base, at least a two pair of columns, each pair positioned adjacent opposite ends of the first and the second rotary die, adjacent one longitudinal end of the first and second elongate rotary dies, the each column of each pair of columns spaced from one another by a distance greater than the maximum outer diameter of the first and second rotary dies with sufficient clearance to allow removal and replacement of at least one of the first and second rotary dies longitudinally between one of the pair pairs of columns;

a cross member extending between and movably engaged with one of the pair pairs of columns; and

an upper die-support bearing mounted to the cross member for rolling engagement with the second rotary die.

47. (New) A modular rotary die frame for use with a first rotary die having a first axis of rotation and a second rotary die having a second axis of rotation parallel to the first axis of rotation comprising:

a base;  
a plurality of independent elongate rods, each rod having a first end and second end defining a path to travel along a length thereof, the first end of each rod mounted to the base in spaced relation to one another;

a cross member engaged with at least two of the plurality of rods for movement along the path of travel;

interchangeable modular die supports adaptable for low and high speed rotary die applications, the interchangeable rotary die supports having a first rotary die support mounted to the base in exclusive rolling engagement with the first rotary die and a second rotary die support mounted to the cross member in exclusive rolling engagement with the second rotary die.

48 (New) The modular die frame of claim 47 wherein the first and the second modular die supports are adapted for low speed applications.

49 (New) The modular die frame of claim 47 wherein the first and the second modular die supports each further comprise a first bearing assembly and a second bearing assembly positioned in longitudinally spaced locations along the axes of rotation adjacent to each end of the corresponding first and second rotary dies, each

Date April 1, 2004

Reply to Office Action dated December 17, 2003

bearing having at least two rollers with axes of rotation extending substantially parallel to one another and each roller angularly spaced from one another with respect to the axis of rotation of the corresponding first and second rotary dies.

50 (New) The modular die frame of claim 49 wherein the first rotary die further comprises a first end surface and an opposite second end surface, the first die having a radially raised flange adjacent to the first and second end surfaces.

51 (New) The modular die frame of claim 50 wherein each bearing roller operably engages the corresponding radial flange along the first axis of rotation to limit longitudinal translation of the first rotary die along the first axis of rotation.

52 (New) The modular die frame of claim 50 wherein the second rotary die includes a first end and a opposite second end positioned between and operably engaged with the raised radial flanges along the second axis of rotation to limit longitudinal translation of the second rotary die with respect to the first rotary die.

53 (New) The modular die frame of claim 47 wherein the interchangeable die supports are adapted for high rotary die rotational speeds.

54 (New) The modular die frame of claim 53 wherein the first rotary and the second rotary die each further comprise a first end surface and opposite second end surface, each die having an elongate journal extending from the first and second end surfaces along the respective axis of rotation; and

the first and the second modular die supports each further comprising a pair of cylindrical roller bearings independent from and spaced from the rods positioned along the respective axis of rotation, each cylindrical roller bearing operably

Date April 1, 2004

Reply to Office Action dated December 17, 2003

engaged with one of the journals for permitting free rotation of the respective die about the respective axis of rotations.

55. (New) A modular rotary die frame for use with a first rotary die having a first axis of rotation and a second rotary die having a second axis of rotation comprising:

a base;

a plurality of independent elongate rods, each rod having a first end and a second end defining a path of travel along a length thereof, the first end of each rod mounted to the base in spaced relation to one another;

a cross member engaged with at least two of the plurality of rods for movement along the path of travel;

interchangeable first and second die supports for exclusively and engageably receiving the first and second rotary dies, the first and second die supports are interchangeable between bearing rollers operably engaged with a raised radial flange on at least one of the first and second rotary dies and cylindrical roller bearings operably engaged with journals extending from the rotary dies.

56. (New) The modular rotary die frame of claim 55 wherein the first and the second die support bearing rollers operably engaged with the raised radial flange each further comprise a first bearing and a second bearing positioned in spaced relation to the rods, each bearing having at least two rollers with axes of rotation substantially parallel to one another and each roller angularly spaced from one another with respect to the axis of rotation of the first and the second rotary dies.

57. (New) The modular rotary die frame of claim 55 wherein the first and the second die support cylindrical roller bearings operably engaged with journals further comprise a first bearing and a second bearing positioned in spaced relation to the rods, each bearing having a cylindrical roller bearing for engagement with the journals.